CLAIMS

1. Ultrasonic contact transducer with multiple elements, this transducer being characterised in that it comprises means of bringing the elements into contact with the surface of an object to be checked and means of determining the positions of the elements relative to the object, using the means of bringing the elements into contact, and in that each element is at least an ultrasonic emitter and the emitting elements are rigid and are assembled to each other mechanically so as to form an articulated structure.

2. Transducer according to claim 1, in which the transducer can be moved relative to the object to be checked and has a deformable emitting surface formed by first faces of the elements and that will be brought into contact with the surface of this object and starting from which ultrasounds are emitted towards the object, control means being provided to generate excitation pulses of the emitting elements, the determination means being designed to define positions of the ultrasound emitting elements relative to the object during displacement of the transducer,

processing means being provided to

- determine, starting from the positions thus determined, delay laws that emitting elements use to generate a focused ultrasonic beam for which the characteristics are controlled with respect to the object, and

- apply these delay laws to the excitation pulses,

ultrasound receiving elements, possibly composed of the emitting elements, being designed to supply signals used to form images related to the object,

the means for bringing into contact being provided to bring the emitting elements into contact with the surface of the object and the determination means being provided to determine the positions of the emitting elements relative to the object through the means bringing the emitting elements into contact.

3. Transducer according to claim 2, in which the means for bringing the emitting elements into contact with the surface of the object comprise mechanical elements, each mechanical element including a portion that is free to move relative to a rigid portion of the transducer, a first end of this moving portion being capable of pressing emitting elements into contact with the surface of the object,

and the means of determining the positions of the emitting elements relative to the object comprise

- first means provided to determine the positions of the emitting elements relative to the rigid portion of the transducer, by measuring the deformation of the emitting surface, and to output signals representative of the positions thus determined, the first means comprising

• distance measurement means, provided to measure the distance between a second end of the moving portion of each mechanical element and an area of the rigid portion of the transducer and

• auxiliary processing means provided to determine the positions of the emitting elements with respect to the

rigid portion of the transducer, using the distances thus determined,

- second means provided to determine the position and orientation of this rigid portion with respect to the object and to output signals representative of the position and the orientation thus determined and

- third means provided to output the positions of the emitting elements with respect to the object using signals output by the first and second means.

4. Transducer according to claim 3, in which the first end of each moving portion is rounded.

5. Transducer according to claim 3, in which the rigid portion of the transducer comprises parallel holes in which the moving portions are respectively free to slide, and each mechanical element also includes elastic means capable of separating the first end of the moving portion corresponding to this mechanical element, from the rigid portion.

6. Transducer according to claim 5, in which each mechanical element also comprises a means in the hole corresponding to it, in which the moving portion of this mechanical element is free to slide with low friction.

7. Transducer according to claim 3, in which the distance measurement means are provided to optically measure the distance between the second end of the moving portion of each mechanical element and an area of the rigid portion, and comprise

- light emission means fixed to the rigid portion and designed to emit light towards this second end, this second end being capable of reflecting this light, and

- light reception means fixed to the rigid portion and provided to receive the light thus reflected, these reception means being capable of outputting signals representative of the distance between this second end and the corresponding zone.

8. Transducer according to claim 7, in which the light emission means and the light reception means include a photo-emitter and a photo-detector respectively, fixed to the rigid portion facing the second end.

9. Transducer according to claim 7, in which the light emission means include a first optical fibre to transmit light and send the light to the second end, and the light reception means include a second optical fibre to transmit light reflected by this second end.

10. Transducer according to claim 7, in which the optical distance measurement means use continuous light beams.

11. Transducer according to claim 7, in which the optical distance measurement means use discontinuous light beams and particularly trains of light waves.

12. Transducer according to claim 3, in which the means of bringing the emitting elements into contact also include a blade that covers second faces of the emitting elements,

the first end of the moving portion of each mechanical element being capable of pressing emitting elements in contact with the surface of the object through the blade, this blade being capable of distributing forces applied by the moving elements on the emitting elements through the blade.

13. Transducer according to claim 3, in which the emitting elements are rigid piezoelectric elements trapped in a flexible substrate that is passive with regard to ultrasounds.

14. Transducer according to claim 13, also comprising strips, the number of which is equal to the number of emitting elements and that are fixed to the face of the flexible substrate that is located facing the mechanical elements, each strip facing the moving portion of one of these mechanical elements, the first end of this moving portion being capable of pressing the emitting elements in contact with the surface of the object through the strip facing it.